



**UNIVERSITY OF SWAZILAND
MAIN EXAMINATION PAPER**

**PROGRAMME: BSC IN LAND AND WATER MANAGEMENT
YEAR 2**

COURSE CODE: LUM 201

TITLE OF PAPER: AGRO CLIMATOLOGY (NEW PROGRAMME)

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: NONE

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO
OTHER QUESTIONS**

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GRANTED BY THE CHIEF INVIGILATOR**

QUESTION 1

a) Table 1 below shows the effective rainfall and calculated crop evapotranspiration at Mhlume for the crop season Nov 1998 - Oct 1999. A sugarcane crop is cut and it ratoons at the beginning of November 1998 and grows over 12 months, i.e. up to October 1999. Use Figure 1 (which relates soil water deficit and sugarcane stress factor) to estimate the yield for that particular season under rainfed conditions, if the potential yield under irrigation would be 13.4 tonnes of sucrose per hectare. Assume a soil moisture deficit of nil at start of growth i.e. November 1.

The yield can be calculated using the equation below:

$1 - (Y_a/Y_m) = k_y [1 - (ET_{cadj}/ET_c)]$, where k_y is the yield response factor, which is 1.2 for sugarcane.

Table 1: Record of effective rainfall and crop ET for the crop season Nov 98 – Oct 99

Month	Effective rainfall (mm)	ET _c (mm)
November	65.0	62.4
December	78.2	126.2
January	90.0	205.0
February	81.0	189.0
March	57.7	170.5
April	39.4	131.3
May	17.0	108.5
June	8.6	86.3
July	7.1	96.1
August	10.0	114.6
September	23.2	121.0
October	48.1	121.5

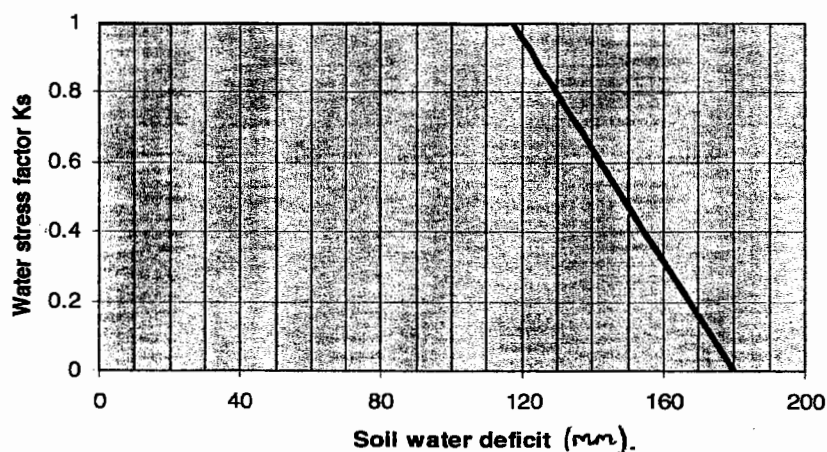


Figure 1: Relationship between stress factor and water deficit

[25 marks]